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| 10/727,039 | 12/04/2003 | Hai-Wen Chen | 4358-0116P | 4864 |
| 2292 7590 06/29/2007 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747 | | | EXAMINER LEE, JOHN W | |
| | | | ART UNIT 2624 | PAPER NUMBER |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

| | | | |
|------------------------------|--------------------------------------|------------------------------------|--|
| Office Action Summary | Application No. 10/727,039 | Applicant(s) CHEN ET AL. | |
| | Examiner John Wahnkyo Lee | Art Unit 2624 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: a "]" on the third line of equations (1) and (6) on paragraphs [0051] and [0073] are missing, respectively.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 2, 13-14, and 18 have insufficient antecedent basis for the limitations in the claims. Claim 2 can be a dependent claim of itself. Based on the following logic and the claim limitations of the previous claims, it will be appropriate if claim 2 is dependent claim of claim 1, claims 13 and 14 are dependent claims of claim 11, and claim 18 is a dependent claim of claim 15.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-2, 4-5, 7-10, 15-16, 19-21, and 24-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Alderson et al. (2002/0159101).

Regarding claim 1, Alderson discloses a system for reducing noise in a detection sensor (abstract, "IR detector array"; Fig. 1- 100 and 102; paragraph [0005]), comprising: a raw digital image of pixels corresponding to energy received at the sensor (Fig. 1; paragraph [0035]); a non-uniformity correction device to remove estimated fixed pattern noise from the pixels of the raw digital image to generate a corrected digital image (abstract; paragraph [0005]); and an array of coefficients to determine the estimated fixed pattern noise, wherein the array of coefficients is based on actual fixed pattern noise measurements that are parametrically fitted over a plurality of temperature ranges (Figs. 2A and 2B; paragraphs [0045]-[0046]).

Regarding claim 2, Alderson discloses each of the plurality of temperature ranges has an integration time for the sensor (Fig. 2A; paragraph [0043]).

Regarding claim 4, Alderson discloses the integration time is an integration time for a focal plane array for the sensor (paragraph [0043]).

Regarding claim 5, Alderson discloses the raw digital image corresponds to the energy received at the focal plane array (Fig. 1, "thermal radiation"; abstract; paragraph [0043]).

Regarding claim 7, Alderson discloses that the non-uniformity correction device includes an estimator to determine the estimated fixed pattern noise over a set of the plurality of temperature ranges (Fig. 2B, paragraph [0047]).

Regarding claim 8, Alderson discloses that the non-uniformity correction device includes a plurality of estimators to determine the estimated fixed noise over a set of the plurality of temperature ranges (Fig. 2B, paragraph [0047]).

Regarding claim 9, Alderson discloses the array of coefficients includes a first set of coefficients and a second set of coefficients (Figs. 3 and 4; paragraphs [0048]-[0050]).

Regarding claim 10, Alderson discloses the first set of coefficients correlate to a first set of the plurality of temperature ranges, and the second set of coefficients correlate to a second set of the plurality of temperature ranges (Figs. 3 and 4; paragraphs [0048]-[0050]).

Regarding claim 15, Alderson discloses a method for reducing noise in a sensor (abstract, "IR detector array"; Fig. 1- 100 and 102; paragraph [0005]), comprising: converting received energy into a raw digital image (Fig. 1; paragraph [0035]); estimating fixed pattern noise in the raw digital image by using an array of coefficients of parametrically fitted measurements of actual fixed pattern noise over a temperature range of a plurality of temperature ranges (Figs. 2A and 2B; paragraphs [0045]-[0046]); and generating a corrected digital image by removing the estimated fixed pattern noise from the raw digital image (Fig. 4-408; paragraph [0051]).

Regarding claim 16, Alderson discloses applying a gain and an offset from the array of coefficients to pixel intensity in the raw digital image (Fig. 5; paragraphs [0050], [0057], and [0058]).

Regarding claim 19, Alderson discloses selecting the array of coefficients according to the temperature range (paragraph [0056]).

Regarding claim 20, Alderson discloses a method for reducing noise in a digital image corresponding to energy received at a sensor (abstract, "IR detector array"; Fig. 1- 100 and 102; paragraph [0005]), comprising: estimating fixed pattern noise in the digital image using an array of coefficients for a temperature range of a plurality of temperature ranges, wherein the array of coefficients represent a gain and an offset of the fixed pattern noise (Figs. 2A and 2B; abstract; paragraphs [0005] and [0045]-[0046]); and removing the estimated fixed pattern noise from the digital image to generate a corrected digital image (Fig. 4-408; paragraph [0051]).

Regarding claim 21, Alderson discloses converting the received energy into the digital image (Figs 1 and 4; paragraph [0051]).

Regarding claim 24, Alderson discloses that various actions of the invention can be performed by a computer or a program instructions being executed one or more processors (paragraph [0033]). Moreover, claim 24 is analogous and corresponds to claim 15. See rejection of claim 15 for further explanation.

Regarding claim 25, Alderson discloses that various actions of the invention can be performed by a computer or a program instructions being executed one or more processors (paragraph [0033]). Moreover, claim 25 is analogous and corresponds to claim 20. See rejection of claim 20 for further explanation.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3, 11-14, and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alderson et al. (2002/0159101) in view of Harton et al. (2003/0107666).

Regarding claim 3, Alderson discloses all the claim limitations of the previous claim except the claim limitation of claim 3. However, Harton discloses a time integrating pixel architecture (Fig. 1-100) comprising a capacitor (Fig. 1-104; paragraph [0015]).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use Harton's invention in Alderson's invention to provide improved performance as suggested by Alderson (paragraph [0008]).

Regarding claim 11, Alderson discloses a sensor system for detecting candidate targets from received energy at an array of detectors within the sensor system (abstract, "IR detector array"; Fig. 1- 100 and 102; paragraph [0005]), comprising: an analog-to-digital converter to convert the voltage to a raw digital image having pixel data of the candidate targets (Fig. 1-104); a non-uniformity correction device to estimate the fixed pattern noise using an array of measurement-based parametrically fitted coefficients

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corresponding to a temperature range for the sensor system and to remove the estimated fixed pattern noise from the raw digital image; and (abstract; Figs. 2A, 2B, and 4-408; paragraphs [0005], [0045]-[0046], [0051]); and a corrected image generated by the non-uniformity correction device that emphasizes the candidate targets in the pixel data (Fig. 4-408 and 412; paragraph [0051]). However, Alderson does not disclose the integration capacitors to control an integration time for the array of detectors to generate a voltage corresponding to the received energy, but Harton does (Fig. 1-100 and 104; paragraph [0015]).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use Harton's invention in Alderson's invention to provide improved performance as suggested by Alderson (paragraph [0008]).

Regarding claim 12, Alderson further discloses the received energy is infrared radiant flux (Fig. 1; "thermal radiation").

Regarding claim 13, Alderson further discloses the array of coefficients includes gains and offsets determined from actual fixed pattern noise measurements (Fig. 5-516 and 6; paragraphs [0057]-[0059]).

Regarding claim 14, Alderson further discloses the integration time corresponds to the temperature range (Fig. 2A; paragraph [0043]).

Regarding claim 17, Alderson discloses all the claim limitations of the previous claim except the claim limitation of claim 17. However, Harton discloses Harton discloses generating a voltage from an array of detectors according to the received

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energy during an integration time of at least one capacitor (Fig. 1-100 and 104; paragraph [0015]).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use Harton's invention in Alderson's invention to provide improved performance as suggested by Alderson (paragraph [0008]).

Regarding claim 18, Harton further discloses adjusting the integration time (paragraph [0020]).

8. Claims 6 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alderson et al. (2002/0159101) in view of Tsuruoka (2004/0027469).

Regarding claim 6, Alderson discloses all the claim limitations of the previous claim except the claim limitation of claim 6. However, Tsuruoka teaches the formulization of the amount of noise that is used when the amount of noise of the pixel of interest is estimated by the coefficient calculating unit (Figs. 5A, 5B, 6A, 6B, and 6C; paragraphs [0060]-[0079]).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use Tsuruoka's invention in Alderson's invention to reduce random noise as suggested by Tsuruoka (paragraph [0003]).

Regarding claim 22, Alderson discloses all the claim limitations of the previous claim except the claim limitation of claim 22. However, Tsuruoka teaches the formulization of the amount of noise that is used when the amount of noise of the pixel

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of interest is estimated by the coefficient calculating unit (Figs. 5A, 5B, 6A, 6B, and 6C; paragraphs [0060]-[0079]).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use Tsuruoka's invention in Alderson's invention to reduce random noise as suggested by Tsuruoka (paragraph [0003]).

9. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Alderson et al. (2002/0159101) in view of Kuwahara (US 5,317,420).

Regarding claim 23, Alderson discloses all the claim limitations of the previous claim except the claim limitation of claim 23. However, Kuwahara discloses representing a non-noise color (col. 16, lines 54-59).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use Kuwahara's invention in Alderson's invention to provide improved performance as suggested by Alderson (paragraph [0008]).

Conclusion

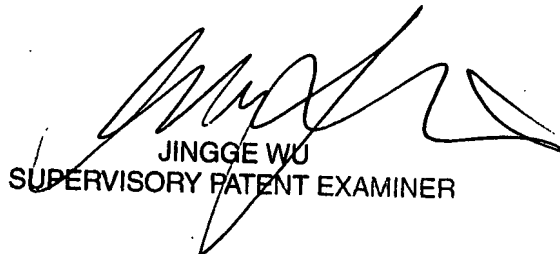
10. No claims are allowed.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Wahnkyo Lee whose telephone number is (571) 272-9554. The examiner can normally be reached on Monday - Friday (Alt.) 7:30 a.m. - 5:00 p.m..

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



JINGGE WU
SUPERVISORY PATENT EXAMINER

John W. Lee
(AU 2624)